

## CLAIMS

### What is claimed is:

- 1 1. A method for building a plurality of individual binding updates in a home agent on behalf  
2 of a mobile node, the home agent being located in an Internet Protocol (IP) network, the  
3 method comprising steps of:
  - 4 - receiving an Aggregated Binding Update (ABU) at the home agent from the  
5 mobile node;
  - 6 - building the plurality of individual binding updates from the ABU, each of the  
7 plurality of individual binding updates having a different destination address  
8 specified in the ABU; and
  - 9 - sending from the home agent each of the plurality of individual binding  
10 updates toward each of the different destination addresses.
- 1 2. The method of claim 1 further comprising a step of, prior to the step of sending the  
2 individual binding updates, signing each of the plurality of individual binding updates  
3 using one of a plurality of authentication keys included in the ABU.
- 1 3. The method of claim 1 further comprises steps of:
  - 2 - prior to the step of sending the individual binding updates, generating a  
3 plurality of authentication keys at the home agent, each of the plurality of  
4 authentication keys being generated by using a first keygen token previously  
5 intercepted and a second keygen token included in the ABU; and
  - 6 - signing each of the plurality of individual binding updates using one of the  
7 generated authentication keys.
- 1 4. The method of claim 1 further comprises steps of, prior to the step of receiving the ABU,  
2 receiving, at the home agent, a first binding update destined to the home agent from the  
3 mobile node.
- 1 5. The method of claim 4, wherein the step of building the plurality of individual binding  
2 updates from the ABU further comprises a step of using the first binding update received  
3 from the mobile node to build the plurality of individual binding updates.

1 6. The method of claim 1 further comprising steps of:

- 2 - after the step of sending the individual binding updates, starting a timer; and
- 3 - intercepting at least one binding acknowledgment destined to the mobile node
- 4 incoming from at least one of the destination addresses.

1 7. The method of claim 6 further comprising steps of:

- 2 - upon expiration of the timer, building, at the home agent, an Aggregated
- 3 Binding Acknowledgment (ABA) from the at least one binding
- 4 acknowledgment; and
- 5 - sending the ABA toward the mobile node.

1 8. The method of claim 6 further comprising steps of:

- 1 - upon interception of a binding acknowledgement incoming from each
- 2 destination address specified in the ABU, building, at the home agent, an
- 3 Aggregated Binding Acknowledgment (ABA) from the at least one binding
- 4 acknowledgment; and
- 5 - sending the ABA toward the mobile node.

1 9. The method of claim 1 further comprising steps of:

- 2 - after the step of sending the individual binding updates, starting a timer;
- 3 - intercepting, at the home agent, at least one negative binding acknowledgment
- 4 destined to the mobile node incoming from at least one of the destination
- 5 addresses;
- 6 - upon expiration of the timer, building, at the home agent, an Aggregated
- 7 Negative Binding Acknowledgment (ANA) from the at least one negative
- 8 binding acknowledgment; and
- 9 - sending the ANA toward the mobile node.

1 10. A method for aggregating binding acknowledgments in a home agent for a mobile node,

2 the home agent being located in an Internet Protocol (IP) network, the method comprising

3 steps of:

- 4 - intercepting, at the home agent, a plurality of binding acknowledgments
- 5 destined to the mobile node;
- 6 - building, at the home agent, an Aggregated Binding Acknowledgment (ABA)
- 7 from the plurality of binding acknowledgments; and
- 8 - sending the ABA toward the mobile node.

1 11. The method of claim 10 further comprising the step of verifying each of the plurality of  
2 binding acknowledgments using one of a plurality of previously generated authentication  
3 keys.

1 12. The method of claim 10 further comprising steps of:

- 2 - prior to the step of intercepting the plurality of binding acknowledgments,  
3 receiving, at the home agent, a first binding update destined to the home agent  
4 from the mobile node; and
- 5 - starting a timer thereafter.

1 13. The method of claim 12, wherein the step of sending the ABA toward the mobile node  
2 further comprises a step of sending the ABA toward the mobile node after expiration of the  
3 timer.

1 14. A home agent in an Internet Protocol (IP) network, the home agent comprising:

- 2 - a binding management module capable of:
  - 3 - building a plurality of individual binding updates from an  
4 Aggregated Binding Update (ABU) received from a mobile node,  
5 each of the plurality of binding updates having a different  
6 destination address specified in the ABU; and
  - 7 - building an Aggregated Binding Acknowledgment (ABA) from a  
8 plurality of binding acknowledgments intercepted from the  
9 destinations specified in the ABU.

1 15. The home agent of claim 14, wherein the binding management module is further capable  
2 of:

- 3 - building an Aggregated Negative Binding Acknowledgment (ANA) from at  
4 least one of negative binding acknowledgments intercepted from the  
5 destinations specified in the ABU.

1 16. The home agent of claim 14, wherein the binding management module is further capable  
2 of:

- 3 - sending each of the plurality of individual binding updates toward each of the  
4 different destination addresses;
- 5 - starting a timer thereafter; and
- 6 - sending the ABA toward the mobile node after expiration of the timer.

1 17. The home agent of claim 14, wherein the binding management module is further capable  
2 of:

- 3 - signing each of the plurality of individual binding updates prior to sending  
4 each of the plurality of individual binding updates toward each of the different  
5 destination addresses; and
- 6 - verifying each of the plurality of binding acknowledgments intercepted from  
7 the destinations specified in the ABU prior to building the ABA.

1 18. The home agent of claim 14, wherein the binding management module is further capable  
2 of:

- 3 - generating a plurality of authentication keys, each of the plurality of  
4 authentication keys being generated by using a first keygen token previously  
5 intercepted from the destinations specified in the ABU and a second keygen  
6 token included in the ABU, each of the plurality of authentication keys being  
7 respectively linked to one of the destinations specified in the ABU.